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ABSTRACT

A study used federal income tax data to examine the long-term earning, unemployment, and interregional mobility patterns among 15,055 persons who graduated from 14 Ohio vocational education programs in 1979. Income data on the graduates' income earned during the 1983 tax year were also compared with U.S. Census Bureau data on 1983 Money Income of Persons in the United States after appropriate adjustments were made for United States-Ohio and Ohio regional income differences. The vocational graduates tended to have higher incomes and lower unemployment rates. With respect to graduates remaining in Ohio five years after graduation, agricultural production and horticulture had the highest state retention rate (90.08 percent). The health occupations education program (associate degree) had a slightly lower than average net retention rate for the state as a whole (83.33 compared with 84.57 percent). (This report includes 29 tables that summarize income, unemployment, and geographic mobility data according to Ohio's 5 geographic regions [central, northeast, northwest, southwest, and other] and 14 vocational programs--agricultural production and horticulture, auto mechanics, home economics, carpentry, electronics, machine shop, cosmetology, occupational work experience, distributive education, secondary-level health occupations education, associate degree-level health occupations education, accounting and data processing, general office, and technical education.) (MN)

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LONG TERM FOLLOW-UP OF VOCATIONAL EDUCATION GRADUATES:

A Study
Based on Federal Income Tax Data

ED282044

by
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U.S. DEPARTMENT OF EDUCATION
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May, 1987

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Job Training Partnership Act (JTPA) coordinates funds which enhance state and local interagency coordination with the following activities being supported: determination of work force issues to be addressed, supply and demand information related to local labor market/training/employment needs; follow-up analyses of client success in gaining and retaining unsubsidized employment; impact studies.

The Long Term Follow-up of Vocational Education Graduates: A Study Based on Federal Income Tax Data was supported by funds from JTPA, through the Division of Vocational and Career Education, the Ohio Department of Education. This research does not necessarily reflect the official position of the United States Department of Labor or the Ohio Department of Education.

It is the policy of the Ohio Department of Education, Division of Vocational and Career Education, that educational activities, employment, programs, and services are offered without regard to race, color, national origin, sex, religion, handicap, or age.

PREFACE

The economic performance of graduates of vocational programs is a primary factor in the evaluation of vocational education with its multi-dimensional effects. This is a follow-up study of vocational education graduates using an original source of information - federal income tax data. The Internal Revenue Service provided the data in batch form in full compliance with the strict requirements for protection of personal information.

The proper design and successful implementation of a study such as this requires the assistance and cooperation of many individuals and organizations. I am indebted to the many who gave generously of their assistance and cooperation. At the Internal Revenue Service, Dr. Fritz Scheuren, Director, Statistics of Income Division lent his gracious support. Mr. Peter Sailer supervised the data provision and provided encouragement and valuable advice. Mr. Michael Strudler with whom I worked closely coordinated the work and displayed professionalism, insight and genuine interest in the project. Mr. Michael Coleman, Ms. Jessica McGlone, and Mr. Ray Salen organized and processed the data with ability and dedication.

Dr. Darrel L. Parks, Director, Vocational and Career Education Ohio Department of Education was a keen supporter of the research project. Dr. G. James Pinchak, Associate Director, was a valuable source of encouragement, judicious coordination and advice. Mr. George Sterling provided assistance and support. Mr. Mark J. Schaff, Manager, Ohio

Occupational Information Coordinating Committee displayed enthusiasm for, dedicated support and insight into the research.

Mr. Edward Frank served very ably in computer data processing and general assistance as did Mr. Eric Christopher, Mr. Heon Jeong, and Ms. Maria Antola. Mrs. LaVerne Peterson worked skillfully on typing some challenging tables. Ms. Tammy Thompson did the final typing and processing of the monograph with professionalism and dedication.

Athens, Ohio I.A. Ghazalah

May 1987

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I

INTRODUCTION

Studies of the economic performance of vocational education graduates generally rely on earnings and related data gathered through personal surveys. Such follow-up studies have a number of limitations:

1. small percentage of returns in the form of completed questionnaires,
2. doubt about the randomness of returns, i.e. that they represent a random sample of the surveyed population,
3. doubt about the accuracy of information provided, partly because the individuals surveyed may not have the information readily available in the form sought by investigators. Particularly in the case of income earned over a full year (let alone various categories of income), the data obtained could suffer from significant inaccuracies.

Information based on federal tax records provides an alternative to the questionnaire method. Such data are standardized by type of income and by period (tax year), and do not rely on the memory nor the selectivity of information provided by individual responses to questionnaires.

This monograph reports on a study utilizing federal income tax records on the 1979 graduates of Ohio's vocational education programs. A computer-generated random sample of

completers of fourteen programs (or combinations of programs) was used for the study. Table A provides information on the study sample of 15,055 graduates. It lists the programs, the number of graduates, and the percentage of females and males in each program. Twelve of these programs are secondary degree programs while the remaining two, listed as 4 and 8, are associate degree programs.

Each of the 1979 graduates was identified by social security number and the code of the vocational program completed. Furthermore, each of the graduates was identified by the school attended. The school location was then used to group trainees by geographical region. The State of Ohio was divided into five regions: Central, Northeast, Northwest, Southwest, and Other. The first four regions contain only metropolitan statistical areas. The Central region included the Columbus Metropolitan Statistical Area (MSA); the Northeast region: the Akron Primary Metropolitan Statistical Area (PMSA), the Canton MSA, the Cleveland PMSA, the Lorain-Elyria PMSA, Jefferson County in the Steubenville-Weirton MSA, and the Youngstown-Warren MSA. The Northwest region included the Lima MSA and Toledo MSA, while the Southwest region was comprised of the Clermont, Hamilton and Warren counties in the Cincinnati PMSA, and the Dayton-Springfield MSA. The region "Ohio-other" included the Mansfield MSA, Washington county in the Parkersburg-Marietta MSA, as well as all non-MSA counties in the State of Ohio. Table B lists these regions by component counties, Diagram C shows the five Ohio regions on a

TABLE A

STUDY SAMPLE OF OHIO'S 1979 VOCATIONAL EDUCATION GRADUATES

VOCATIONAL PROGRAM	NUMBER OF GRADUATES	PERCENTAGE FEMALES	PERCENTAGE MALES
1. Agricultural Production and Horticulture	575	51.1%	48.9%
2. Distributive Education	2,159	56.6	43.4
3. Health Occupations Education	1,142	95.3	4.7
4. Health Occupations Education (Associate Degree)	989	91.5	8.5
5. Home Economics Education	2,171	80.2	19.8
6. Accounting, Computing and Business Data Processing	1,007	63.3	36.7
7. General Office Clerical, Stenographic, Secretarial, and Related Occupations	1,567	98.1	1.9
8. Technical Education (Associate Degree)	957	11.3	88.7
9. Auto Mechanics	622	0.9	99.1
10. Carpentry	520	0.2	99.8
11. Electronics	674	2.6	97.4
12. Machine Shop	803	1.5	98.5
13. Cosmetology	899	98.9	1.1
14. Occupational Work Experience	970	28.5	71.5
TOTAL	15,055	58.02%	41.98%

I.A. Ghazalan, Long Term Follow-Up of Vocational Education Graduates: A Study Based on Federal Income Tax Data, Ohio University and Ohio Department of Education, Division of Vocational and Career Education, 1987.

TABLE B

LIST OF STATE GEOGRAPHIC REGIONS

The State of Ohio was divided into five geographic regions. Four of the regions (Central, Northeast, Northwest, and Southwest) contain only metropolitan statistical areas. The fifth region, Ohio-other, has the Mansfield MSA and Washington County of the Parkersburg-Marietta MSA, as well as all non-MSA counties in the State of Ohio.

The components of each of the regions are listed below:

1. CENTRAL OHIO
   Columbus MSA (Delaware, Fairfield, Franklin, Licking, Madison, Pickaway, and Union counties)

2. NORTHEAST OHIO
   Akron PMSA (Portage and Summit counties)
   Canton MSA (Carroll and Stark counties)
   Cleveland PMSA (Cuyohoga, Geauga, Lake, and Medina counties)
   Lorain-Elyria PMSA (Lorain county)
   Steubenville-Weirton MSA (Jefferson county)
   Youngstown-Warren MSA (Mahoning and Trumbull counties)

3. NORTHWEST OHIO
   Lima MSA (Allen and Auglaize counties)
   Toledo MSA (Fulton, Lucas, and Wood counties)

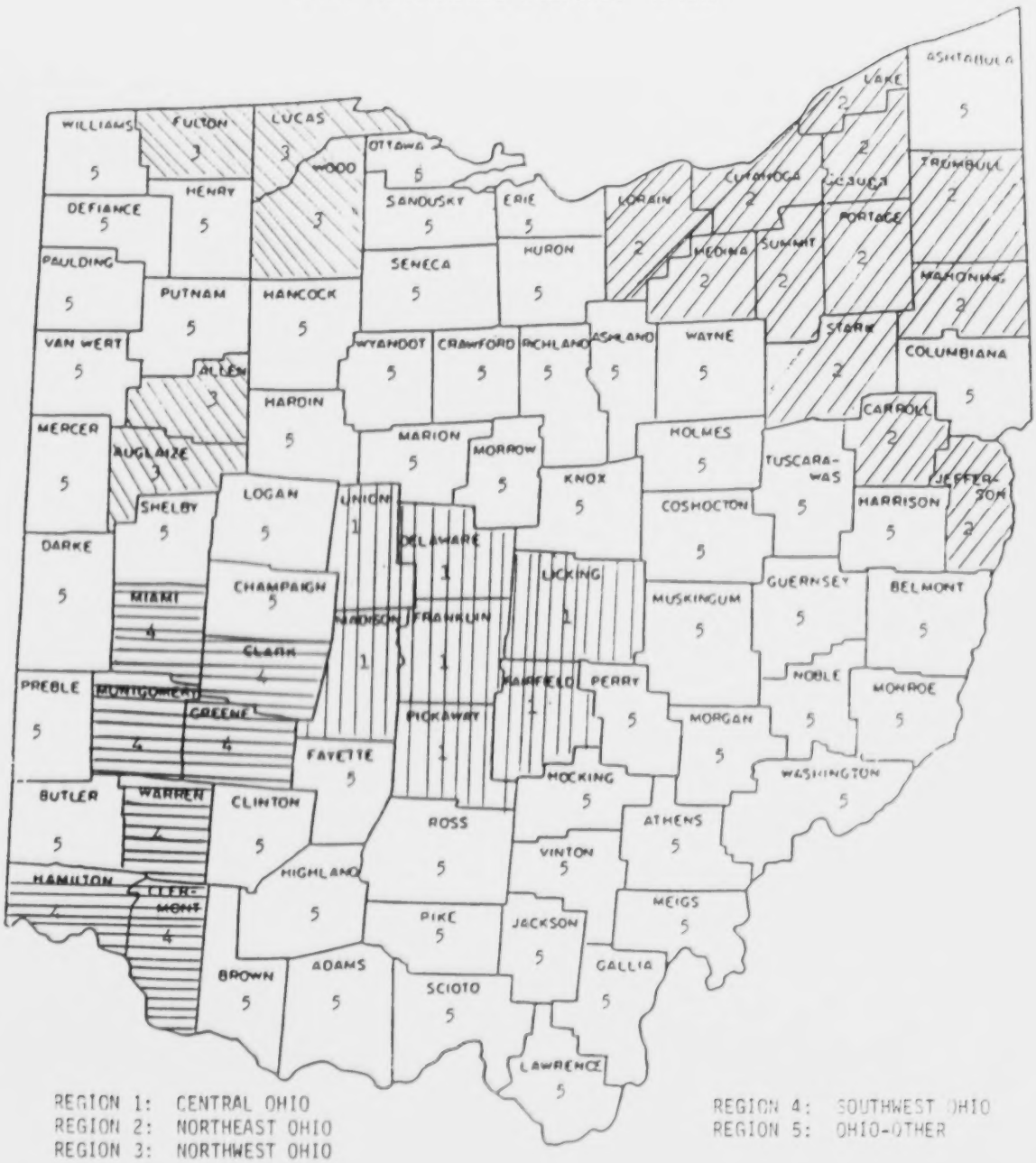
4. SOUTHWEST OHIO
   Cincinnati PMSA (Clermont, Hamilton, Warren counties)
   Dayton-Springfield MSA (Clark, Greene, Miami, and Montgomery counties)

5. OHIO-OTHER
   Mansfield MSA (Richland county)
   Parkersburg-Marietta MSA (Washington county)
   All Non-MSA Counties: Adams, Ashland, Ashtabula, Athens, Belmont, Brown, Clinton, Columbiana, Coshocton, Crawford, Darke, Defiance, Erie, Fayette, Gallia, Guernsey, Hancock, Hardin, Harrison, Henry, Highland, Hocking, Holmes, Huron Jackson, Knox, Lawrence, Licking, Logan, Mahoning, Marion, Meigs, Mercer, Monroe, Morgan, Morrow, Muskingum, Noble, Paulding, Perry, Pike, Ross, Sandusky, Scioto, Seneca, Shelby, Tuscarawas, Union, Vinton, Wayne, Williams, and Wyandot.

I.A. Ghazalah, Long Term Follow-Up of Vocational Education Graduates: A Study Based on Federal Income Tax Data, Ohio University and Ohio Department of Education, Division of Vocational and Career Education, 1987.

DIAGRAM C

STATE GEOGRAPHIC REGIONS: A MAP



REGION 1: CENTRAL OHIO
REGION 2: NORTHEAST OHIO
REGION 3: NORTHWEST OHIO
REGION 4: SOUTHWEST OHIO
REGION 5: OHIO-OTHER

I.A. Ghazalah, Long Term Follow-Up of Vocational Education Graduates: A Study Based on Federal Income Tax Data, Ohio University and Ohio Department of Education, Division of Vocational and Career Education, 1987.

state map, while Table D presents the distribution of the 1979 study sample graduates by vocational program and training region.

Under a negotiated agreement with the Internal Revenue Service, the Statistics of Income Division of IRS was provided on a magnetic tape with a list of social security numbers in sequence of the 15,055 vocational education graduates coded by vocational program attended. In addition, the Internal Revenue Service was furnished on hard copy with a list of all zip codes included in each of the five Ohio geographical regions. The list was developed using the following source materials:

1. Bureau of the Budget, Office of Management and Budget, Standard Metropolitan Statistical Areas: Titles and Definitions, Press Release 83-20, June 27, 1983,
2. National Technical Information Service, U.S. Department of Commerce, Five-Digit Zip Code Area Data (from 1983 returns), Area four, Codes 43000 through 45899,
3. U.S. Postal Service, Map: National Service Area 4 (including Ohio) showing 3-Digit Zip Code Boundaries.

The Internal Revenue Service utilized its Information Returns Processing File (IRPF) to prepare data on the 15,055 study sample of Ohio's 1979 vocational education graduates. The IRPF contains data from the following sources:

TABLE D

STUDY SAMPLE OF VOCATIONAL EDUCATION GRADUATES
DISTRIBUTION OF TRAINEES BY VOCATIONAL PROGRAM AND GEOGRAPHICAL REGION

VOCATIONAL EDUCATION PROGRAM	CENTRAL OHIO	NORTHEAST OHIO	NORTHWEST OHIO	SOUTHWEST OHIO	OHIO OTHER	ALL REGIONS
Agricultural Production and Horticulture	74	49	23	166	263	575
Distributive Education	73	299	52	186	1,549	2,159
Health Occupations Education	91	162	49	99	741	1,142
Health Occupations Education (Associate Degree)	1	139	-	-	849	989
Home Economics Education	69	306	74	248	1,474	2,171
Accounting, Computing and Business Data Processing	53	104	41	133	676	1,007
General Office Clerical, Stenographic, Secretarial, and Related Occupations	81	253	7	154	1,072	1,567
Technical Education (Associate Degree)	-	-	99	12	846	957
Auto Mechanics	38	43	22	59	460	622
Carpentry	48	-	32	75	365	520
Electronics	61	83	38	84	408	674
Machine Shop	50	128	13	57	555	803
Cosmetology	40	124	41	94	600	899
Occupational Work Experience	46	145	27	40	712	970

I.A. Ghazalah, Long Term Follow-Up of Vocational Education Graduates: A Study Based on Federal Income Tax Data, Ohio University and Ohio Department of Education, Division of Vocational and Career Education, 1987.

1. W-2 Forms filed by employers
2. Form 1099-Misc., Statement for Recipients of Miscellaneous Income
3. Form 1099-INT
4. Form 1099-DIV
5. Form 1099-G

Table E shows the data output format used by the Internal Revenue Service for this purpose. A completed table in this format was provided by IRS for each of the fourteen vocational programs, in each of the five Ohio regions as well as in a sixth (outside Ohio) region. The latter region included those among the 1979 graduates who were identified as non-Ohio residents in 1983, since their listed zip codes were not among those identifying the five Ohio regions.

The IRS Statistics of Income Division reviewed all tables to assure that no cell contained data on less than 10 individuals, in compliance with disclosure requirements. When necessary, data cells were combined. Furthermore, all tables were scrutinized and cleared by the IRS Disclosure Division before their release.

TABLE E
DATA OUTPUT FORMAT
TRAINEES OF 1979 VOCATIONAL AND TECHNICAL TRAINING PROGRAMS
INCOME DATA BY WAGE AND SALARIES
TAX YEAR 1983

	WAGES AND SALARIES		DIVIDENDS		INTEREST INCOME		UNEMPLOYMENT		OTHER INCOME	
	NUMBER OF RETURNS	AMOUNT	NUMBER OF RETURNS	AMOUNT	NUMBER OF RETURNS	AMOUNT	NUMBER OF RETURNS	AMOUNT	NUMBER OF RETURNS	AMOUNT
TOTAL										
ZERO WAGES										
UNDER $5,500										
$5,500 < $7,000										
$7,000 < $8,500										
$8,500 < $10,000										
$10,000 < $11,500										
$11,500 < $13,000										
$13,000 < $14,500										
$14,500 < $16,000										
$16,000 AND OVER										

I.A. Ghazalah, Long Term Follow-Up of Vocational Education Graduates: A Study Based on Federal Income Tax Data, Ohio University and Ohio Department of Education, Division of Vocational and Career Education, 1987.

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II

INCOME OF VOCATIONAL EDUCATION GRADUATES: 1983 INCOME TABULATIONS

The data provided by the Internal Revenue Service were used to determine the economic performance of the 1979 graduates of the vocational programs studied four years following their graduation.

Tables 1 through 14 present data on the 1983 Tax Year reported incomes of the 1979 vocational education graduates for each of the fourteen programs.[1] Reported income is the sum of wages and salaries, income from interest, dividends and other income (miscellaneous income from work provided by other than employees) as reported to the Internal Revenue Service.

Table 6, for example, provides the reported income data of those who completed the Accounting, Computing and Business Data Processing programs. For the entire group of trainees, the mean reported income in 1983 was $9,235. Among the group, reported income varied as follows: 27.16% of them received less than $5,500 (a mean of $3,102), 9.55% between $5,500 and $6,999 (a mean of $6,277), another 9.55% between $7,000 and $8,499 (a mean of $7,832), 11.63% between $8,500 and $9,999 (a mean of $9,352), 12.12% between $10,000 and $11,499 (a mean of $10,784), 10.89% between $11,500 and $12,999 (a mean of $12,265), 5.02% between $13,000 and $14,499 (a mean of

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[1]Internal Revenue Service data were provided on 14,929 of the 15,055 vocational graduates, i.e. 99.13% of the study sample.

The Columbus Dispatch

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EDITORIALS

Vocational education

Ohio spent $450 million on vocational education programs over the past two years.

Was it worth it?

The results of an Ohio Department of Education study using data from the Internal Revenue Service suggest that vocational education is a sound investment. In fact, according to figures based on the earnings of 15,055 workers who graduated in 1979 from 12 Ohio vocational programs and two associate degree technical programs, those with vocational training earn about 21 percent more than those without it.

In central Ohio, for example, the health-occupation graduates of a two-year technical program earned an average of $15,363 annually.

Although that was the lowest earnings rate for similarly trained people in the five regions studied, it was still 38 percent higher than the earnings of persons with two years of college but no specialized training.

Other findings were that workers with vocational education have a lower unemployment rate and that an estimated 85 percent of vocational education graduates were working in Ohio four years later.

A frequent criticism of the Buckeye State has been that its best and brightest students become its leading export when they graduate from technical training or college and, unable to find suitable jobs, move to other states.

Department of Education officials are hoping to eventually strike an even balance between the number of high school juniors and seniors in vocational programs and the number in college preparatory courses.

It is a worthwhile goal. About 38 percent of the state's high school juniors and seniors are enrolled in job-training education.

It is gratifying to see the investment in and commitment to vocational education in Ohio paying off. And it's good to see the IRS cooperating with state government in providing accurate data with which to test the effectiveness of vocational education.

As it should, the IRS batches the data to ensure confidentiality and protect individual privacy.

But the large test population provides an accurate measure of program effectiveness, one that could be used periodically to ensure that vocational programs remain properly in tune with the times and a sound investment for the Ohio taxpayers who support them.

TABLE 1

AGRICULTURAL PRODUCTION AND HORTICULTURE
REPORTED INCOME
(1983 TAX YEAR)

Size of Reported Income	All Region		Outside Ohio		All Ohio		Central Ohio		Northeast Ohio		Northwest Ohio		Southwest Ohio		Ohio-Other	
	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean
Under $5,500	42.25%	$2,710	31.86%	$2,654	36.53%	$2,843	41.18%	$2,423	44.58%	$2,876	50.00%	$1,669	17.95%	$2,826	36.05%	$2,908
$5,500-$6,999	9.20	6,410	15.92	6,404	20.24	6,217			15.66	6,165			17.96	6,148	21.16	6,243
$7,000-$8,499	10.62	7,914					29.40	7,519			42.85	6,557				
$8,500-$9,999	9.80	9,323	23.01	8,229					18.07	8,803			28.20	8,623	20.93	8,794
$10,000-$11,499	8.72	10,855														
$11,500-$12,999	5.40	12,315			33.80	9,778										
$13,000-$14,999	4.21	13,668	11.51	11,934			29.42	12,995	9.64	12,120	7.15	16,106	35.89	14,354	21.86	13,628
$14,500-$15,999	2.26	15,447														
$16,000 and over	7.54	22,177	17.70	24,948	9.43	18,412			12.05	16,365						
TOTAL	100.00%	$7,697	100.00%	$9,547	100.00%	$7,338	100.00%	$7,030	100.00%	$7,574	100.00%	$4,796	100.00%	$9,196	100.00%	$7,224

I.A. Ghazalah, Long Term Follow-Up of Vocational Education Graduates: A Study Based on Federal Income Tax Data, Ohio University and Ohio Department of Education, Division of Vocational and Career Education, 1987.

TABLE 2

DISTRIBUTIVE EDUCATION
REPORTED INCOME
(1983 TAX YEAR)

Size of Reported Income	All Region		Outside Ohio		All Ohio		Central Ohio		Northeast Ohio		Northwest Ohio		Southwest Ohio		Ohio-Other	
	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean
Under $5,500	37.27%	$2,613	33.32%	$3,354	35.36%	$2,641	26.67%	$2,373	38.89%	$2,757	25.00%	$3,473	41.38%	$4,266	34.21%	$2,311
$5,500-$6,999	8.93	6,273														
$7,000-$8,499	11.16	7,953	28.58	7,738	31.49	7,593	26.67	8,751	44.44	7,423			27.59	7,422	32.46	7,670
$8,500-$9,999	14.51	9,270														
$10,000-$11,499	9.15	10,797									75.00	11,173				
$11,500-$12,999			14.29	10,548	25.41	11.451			16.67	10,340			24.14	10,830	23.68	11,891
$13,000-$14,499	9.60	13,322					46.66	13,128								
$14,500-$15,999	3.35	15,407	23.81	19,521	7.74	18,705							6.89	16,942	9.65	18,467
$16,000 and over	6.03	21.944														
TOTAL	100.00%	$7,872	100.00%	$9,483	100.00%	$7,682	100.00%	$8,390	100.00%	$6,388	100.00%	$9,248	100.00%	$7,595	100.00%	$7,878

I.A. Ghazalah, Long Term Follow-Up of Vocational Education Graduates: A Study Based on Federal Income Tax Data, Ohio University and Ohio Department of Education, Division of Vocational and Career Education, 1987.

TABLE 3

HEALTH OCCUPATIONS EDUCATION
REPORTED INCOME
(1983 TAX YEAR)

Size of Reported Incomes	All Regions		Outside Ohio		All Ohio		Central Ohio		Northeast Ohio		Northwest Ohio		Southwest Ohio		Ohio-Other	
	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean
Under $5,500	34.98%	$2,546	27.66%	$2,380	29.03%	$2,707	23.81%	$2,124	27.91%	$2,440			23.53%	$4,719	29.53%	$2,710
$5,500-$6,000	7.99	6,230														
$7,000-$8,499	11.25	7,817	25.53	7,745	30.82	6,964	52.38	6,839	20.93	7,099			17.65	6,970	31.61	7,036
$8,500-$9,999	13.72	9,265														
$10,000-$11,499	10.69	10,692														
$11,500-$12,999	7.20	12,286	31.92	10,755	27.24	10,257			34.88	10,266			29.41	9,951	26.94	10,286
$13,000-$14,499	5.06	13,844					23.81	10,899								
$14,500-$15,999	3.94	15,313	14.89	18,341	12.91	15,514			16.28	14,658			29.41	15,598	11.92	15,841
$16,000 and over	5.17	19,557														
TOTAL	100.00%	$7,884	100.00%	$8,800	100.00%	$7,728	100.00%	$6,683	100.00%	$8,134			100.00%	$9,855	100.00%	$7,683

I.A. Ghazalah, Long Term Follow-Up of Vocational Education Graduates: A Study Based on Federal Income Tax Data, Ohio University and Ohio Department of Education, Division of Vocational and Career Education, 1987.

TABLE 4

HEALTH OCCUPATIONS EDUCATION (ASSOCIATE DEGREE)
REPORTED INCOME
(1983 TAX YEAR)

Size of Reported Incomes	All Regions		Outside Ohio		All Ohio		Central Ohio		Northeast Ohio		Northwest Ohio		Southwest Ohio		Ohio-Other	
	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean
Under $5,500	7.49%	$3,095	9.76%	$3,518	5.69%	$3,572			10.29%	$2,514					5.33%	$3,671
$5,500-$6,999	2.31	6,201														
$7,000-$8,499	2.77	7,994	8.54	7,673	8.77	8,071	14.28%	$7,750	7.35	7,491					8.67	8,104
$8,500-$9,999	3.81	9,650									22.22	10,984				
$10,000-$11,499	5.88	11,425														
$11,500-$12,999	6.92	12,656	13.41	13,249	16.35	12,269			13.24	12,952					17.33	12,167
$13,000-$14,499	5.42	14,135					85.72	16,632								
$14,500-$15,999	6.81	15,424	68.29	21,999	69.19	20,290			69.12	20,729	77.78	20,666			68.67	20,314
$16,000 and over	58.59	21,788														
TOTAL	100.00%	$17,094	100.00%	$17,799	100.00%	$16,957	100.00%	$15,363	100.00%	$16,851	100.00%	$18,514	100.00%	$16,768	100.00%	$16,956

I.A. Ghazalah, Long Term Follow-Up of Vocational Education Graduates: A Study Based on Federal Income Tax Data, Ohio University and Ohio Department of Education, Division of Vocational and Career Education, 1987.

TABLE 5

HOME ECONOMICS
REPORTED INCOME
(1983 TAX YEAR)

Size of Reported Incomes	All Regions Percent	All Regions Mean	Outside Ohio Percent	Outside Ohio Mean	All Ohio Percent	All Ohio Mean	Central Ohio Percent	Central Ohio Mean	Northeast Ohio Percent	Northeast Ohio Mean	Northwest Ohio Percent	Northwest Ohio Mean	Southwest Ohio Percent	Southwest Ohio Mean	Ohio-Other Percent	Ohio-Other Mean
Under $5,500	46.64%	$2,435	30.77%	$2,703	41.05%	$2,296	45.46%	$3,032	40.27%	$2,336	44.43%	$2,302	48.57%	$2,407	40.12%	$2,247
$5,500-$6,999	11.49	6,336			14.11	5,508			12.50	6,283					15.34	5,544
			17.59	6,574									22.86	5,823		
$7,000-$8,499	11.36	7,858					36.36	7,483	20.83	7,211						
					19.37	7,286									20.65	7,350
$8,500-$9,999	9.95	9,236							8.34	9,838						
$10,000-$11,499	5.78	10,815	32.97	8,559												
									9.73	12,561	27.79	10,256			13.86	10,353
$11,500-$12,999	4.70	12,169			14.73	10,323										
							18.18	11,374					28.57	10,507		
$13,000-$14,499	2.55	13,906														
$14,500-$15,999	2.42	15,229	18.67	17,034												
					10.74	16,436					27.78	17,429			10.03	16,740
$16,000 and over	5.11	21,007							8.33	16,694						
TOTAL	100.00%	$6,669	100.00%	$7,983	100.00%	$6,417	100.00%	$6,167	100.00%	$6,660	100.00%	$8,713	100.00%	$5,483	100.00%	$6,384

I.A. Ghazalah, Long Term Follow-Up of Vocational Education Graduates: A Study Based on Federal Income Tax Data, Ohio University and Ohio Department of Education, Division of Vocational and Career Education, 1987.

TABLE 6

ACCOUNTING, COMPUTING AND BUSINESS DATA PROCESSING
REPORTED INCOME
(1983 TAX YEAR)

Size of Reported Incomes	All Regions		Outside Ohio		All Ohio		Central Ohio		Northeast Ohio		Northwest Ohio		Southwest Ohio		Ohio-Other	
	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean
Under $5,500	27.16%	$3,102	20.93%	$4,311	27.38%	$2,062	22.22%	$2,909	20.93%	$3,011	14.29%	$1,840			30.58%	$3,026
$5,500-$6,999	9.55	6,277														
$7,000-$8,499	9.55	7,832	48.83	7,500	24.78	7,581	5.56	9,316	37.21	7,782	42.86	7,293	41.66	7,176	23.14	7,494
$8,500-$9,999	11.63	9,352														
$10,000-$11,499	12.12	10,784									28.57	10,175	29.17	11,025		
$11,500-$12,999	10.89	12,265	20.94	10,796	31.12	11,488	50.00	11,835	30.23	11,566					30.20	11,511
$13,000-$14,449	5.02	13,806									14.29	14,445				
$14,500-$15,999	4.04	15,350														
$16,000 and over	10.04	19,950	9.30	16,476	16.72	18,199	22.22	18,855	11.63	17,177			29.17	18,489	16.08	18,304
TOTAL	100.00%	$9,235	100.00%	$8,358	100.00%	$9,061	100.00%	$11,272	100.00%	$9,020	100.00%	8,358	100.00%	$11,598	100.00%	$9,078

I.A. Ghazalah, Long Term Follow-Up of Vocational Education Graduates: A Study Based on Federal Income Tax Data, Ohio University and Ohio Department of Education, Division of Vocational and Career Education, 1987.

TABLE 7

GENERAL OFFICE, STENOGRAPHIC, SECRETARIAL AND RELATED OCCUPATIONS
REPORTED INCOME
(1983 TAX YEAR)

Size of Reported Income	All Regions		Outside Ohio		All Ohio		Central Ohio		Northeast Ohio		Northwest Ohio		Southwest Ohio		Ohio-Other	
	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean
Under $5,500	29.11%	$2,751	33.33%	$2,431	24.98%	$2,717	13.64%	$3,045	38.89%	$2,647					22.61%	$2,685
$5,500-$6,999	7.42	6,299	5.12	5,949	5.93	6,007	9.09	5,776	6.67	5,740			20.94	3,353	6.05	5,781
$7,000-$8,449	10.00	7,837			8.89	7,100			8.89	7,181			4.65	7,033	8.92	7,080
$8,500-$9,999	12.90	9,345	23.07	7,974	9.39	8,545	22.73	7,773	24.45	9,315			11.63	8,524		
$10,000-$11,499	2.58	10,786											18.60	10,019	20.07	9,203
$11,500-$12,999	10.40	12,315	26.93	10,638	26.86	10,518	18.19	10,736								
$13,000-$14,499	8.31	13,749											30.23	11,588	25.16	11,687
$14,500-$15,999	4.20	15,334			16.30	13,000	36.38	18,418	21.10	11,819						
$16,000 and over	5.08	19,591	11.55	23,403	7.62	16,801							13.95	16,133	17.19	15,208
TOTAL	100.00%	$8,674	100.00%	$8,520	100.00%	$8,696	100.00%	$11,355	100.00%	$6,822	100.00%	$6,937	100.00%	$9,071	100.00%	$8,991

I.A. Ghazalah, Long Term Follow-Up of Vocational Education Graduates: A Study Based on Federal Income Tax Data, Ohio University and Ohio Department of Education, Division of Vocational and Career Education, 1987.

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TABLE 8

TECHNICAL EDUCATION (ASSOCIATE DEGREE)
REPORTED INCOME
(1983 TAX YEAR)

Size of Reported Income	All Regions		Outside Ohio		All Ohio		Central Ohio		Northeast Ohio		Northwest Ohio		Southwest Ohio		Ohio-Other	
	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean
Under $5,500	9.98%	$2,955			9.49%	$2,882			11.36%	$2,471			19.22%	$4,139	9.92%	$2,909
$5,500-$6,999	3.53%	6,741														
$7,000-$8,499	5.64	9,162	16.35%	$5,723	8.69	7,158					9.52	6,284			10.18	7,947
$8,500-$9,999							14.28	11,028								
$10,000-$11,499	4.23	11,416														
$11,500-$12,999	5.29	12,587	7.55	11,624	13.13	12,283			11.36	11,261	23.81	11,797	19.24	12,713	12.53	12,335
$13,000-$14,499	3.76	14,098														
$14,500-$15,999	6.11	15,321														
$16,000 and over	61.46	24,773	76.10	26,510	68.69	22,315	85.72	21,258	77.28	19,645	66.67	21,747	61.54	23,086	67.37	22,340
TOTAL	100.00%	$18,889	100.00%	$21,988	100.00%	$17,893	100.00%	$19,797	100.00%	$16,741	100.00%	$17,906	100.00%	$17,447	100.00%	$17,692

I.A. Ghazalah, Long Term Follow-Up of Vocational Education Graduates: A Study Based on Federal Income Tax Data, Ohio University and Ohio Department of Education, Division of Vocational and Career Education, 1987.

TABLE 9

AUTO MECHANICS
REPORTED INCOME
(1983 TAX YEAR)

Size of Reported Income	All Regions		Outside Ohio		All Ohio		Central Ohio		Northeast Ohio		Northwest Ohio		Southwest Ohio		Ohio-Other	
	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean
Under $5,500	23.57%	$2,901	22.58%	$2,452	24.12%	$2,971			41.66%	$2,275			22.73%	$3,365	23.08%	$3,148
$5,500-$6,999	7.27	6,380														
$7,000-$8,499	8.25	7,826	32.26	7,473	25.44	7,785							31.82	7,184	25.44	7,493
$8,500-$9,999	12.57	9,601														
$10,000-$11,499	10.81	10,787							29.17	12,619						
$11,500-$12,999	10.61	12,346	25.81	10,840	23.25	11,291							9.09	11,622	24.85	11,282
$13,000-$14,499	5.70	13,747														
$14,500-$15,999	5.31	15,286														
$16,000 and over	15.91	20,740	19.35	21,094	27.19	18,825			29.17	17,954			36.36	18,648	26.63	18,977
TOTAL	100.00%	$10,370	100.00%	$9,844	100.00%	$10,441	100.00%	$9,157	100.00%	$9,865	100.00%	$12,030	100.00%	$10,888	100.00%	$10,489

I.A. Ghazalah, Long Term Follow-Up of Vocational Education Graduates: A Study Based on Federal Income Tax Data, Ohio University and Ohio Department of Education, Division of Vocational and Career Education, 1987.

TABLE 10

CARPENTRY
REPORTED INCOME
(1983 TAX YEAR)

Size of Reported Income	All Regions Percent	All Regions Mean	Outside Ohio Percent	Outside Ohio Mean	All Ohio Percent	All Ohio Mean	Central Ohio Percent	Central Ohio Mean	Northeast Ohio Percent	Northeast Ohio Mean	Northwest Ohio Percent	Northwest Ohio Mean	Southwest Ohio Percent	Southwest Ohio Mean	Ohio-Other Percent	Ohio-Other Mean
Under $5,500	23.65%	$2,796	5.88%	$1,611	26.86%	$1,590	25.00%	$2,830					21.05%	$3,715	28.10%	$2,776
$5,500-$6,999	7.73	6,299														
$7,000-$8,499	11.71	8,023														
			32.35	8,160	30.35	7,717							31.58	7,902	30.72	7,730
$8,500-$9,999	12.18	9,299					31.25	8,178								
$10,000-$11,499	11.24	10,826														
$11,500-$12,999	8.20	12,236	20.59	11,207	19.90	11,347									17.65	11,502
$13,000-$14,499	3.98	13,923														
													47.37	13,757		
$14,500 $15,999	7.02	15,392														
			41.18	20,220	22.89	18,616	43.75	18,658							23.53	18,192
$16,000 and over	14.29	21,504														
TOTAL	100.00%	$10,148	100.00%	$13,378	100.00%	$9,288	100.00%	$11,367			100.00%	$7,132	100.00%	$9,794	100.00%	$9,466

I.A. Ghazalan, Long Term Follow-Up of Vocational Education Graduates: A Study Based on Federal Income Tax Data, Ohio University and Ohio Department of Education, Division of Vocational and Career Education, 1987.

TABLE II

ELECTRONICS
REPORTED INCOME
(1983 TAX YEAR)

Size of Reported Income	All Regions		Outside Ohio		All Ohio		Central Ohio		Northeast Ohio		Northwest Ohio		Southwest Ohio		Ohio-Other	
	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean
Under $5,500	23.83%	$2,558	21.15%	$2,452	22.02%	$2,792	30.00%	$2,461	15.38%	$2,337	44.44%	$3,788	33.33%	$4,443	22.34%	$2,721
$5,500-$6,999	6.71	6,131			8.30	5,692			12.82	5,769					5.85	5,647
$7,000-$8,499	9.40	8,187	19.23	7,410	7.58	8,152	25.00	6,130							6.91	7,578
$8,500-$9,999	12.42	9,504	13.46	8,931	9.39	9,281			28.21	8,922	33.34	8,849	33.34	8,715	9.04	9,562
$10,000-$11,499	8.72	10,772	13.46	10,028	7.94	10,182	20.00	10,170							14.36	10,846
$11,500-$12,999	6.54	12,271			12.28	12,263										
$13,000-$14,499	5.20	13,747	11.54	12,943					15.38	13,433						
$14,500-$15,999	5.20	15,517			6.50	14,557					22.22	17,406	9.52	13,445	14.90	13,763
$16,000 and over	21.98	21,951	21.16	24,876	25.99	19,956	25.00	21,877	28.21	19,784			23.81	19,920	26.60	19,776
TOTAL	100.00%	$11,060	100.00%	$11,252	100.00%	$11,024	100.00%	$9,774	100.00%	$11,655	100.00%	$8,502	100.00%	$10,409	100.00%	$11,194

I.A. Ghazalah, Long Term Follow-Up of Vocational Education Graduates: A Study Based on Federal Income Tax Data, Ohio University and Ohio Department of Education, Division of Vocational and Career Education, 1987.

TABLE 12

MACHINE SHOP
REPORTED INCOME
(1983 TAX YEAR)

Size of Reported Income	All Regions		Outside Ohio		All Ohio		Central Ohio		Northeast Ohio		Northwest Ohio		Southwest Ohio		Ohio-Other	
	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean
Under $5,500	25.15%	$3,174	14.28%	$4,066	29.01%	$3,526	60.00	$3,499	25.49%	$3,070	33.33%	$3,241	27.27%	$3,067	28.99	$3,639
$5,500-$6,999	6.14	6,391														
$7,000-$8,499	7.31	7,875	40.82	8,073	21.41	7,960			31.37	8,437			22.73	8,281	19.34	7,835
$8,500-$9,999	9.80	9,199														
$10,000-$11,499	5.99	10,832														
$11,500-$12,999	8.19	12,311	16.33	12,330	16.06	12,242	40.00	12,545	9.80	12,269					18.21	12,239
$13,000-$14,499	5.26	13,738														
$14,500-$15,999	6.87	15,239											50.00	18,924		
$16,000 and over	25.29	20,961	28.57	19,334	33.52	19,988			33.34	20,630	66.67	18,540			33.46	19,747
TOTAL	100.00%	$11,396	100.00%	$11,413	100.00%	$11,393	100.00%	$7,118	100.00%	$11,530	100.00%	$13,441	100.00%	$12,598	100.00%	$11,406

I.A. Ghazalah, Long Term Follow-Up of Vocational Education Graduates: A Study Based on Federal Income Tax Data, Ohio University and Ohio Department of Education, Division of Vocational and Career Education, 1987.

TABLE 13

COSMETOLOGY
REPORTED INCOME
(1983 TAX YEAR)

Size of Reported Income	All Regions		Outside Ohio		All Ohio		Central Ohio		Northeast Ohio		Northwest Ohio		Southwest Ohio		Ohio-Other	
	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean
Under $5,500	43.06%	$2,706	54.55%	$2,783	31.11%	$2,969			32.35%	$3,269					31.11%	$2,969
$5,500-$6,999	11.04	6,397											53.33	6,400	38.67	6,596
$7,000-$8,499	12.77	7,822	21.21	7,031	38.67	6,596			41.18	6,337						
$8,500-$9,999	11.36	9,327														
$10,000-$11,499	6.31	10,831														
$11,500-$12,999	5.21	12,339			20.00	10,091									20.48	10,055
$13,000-$14,499	4.10	13,833														
$14,500-$15,999	2.52	15,343	24.24	11,113					26.47	12,218			46.67	13,962		
$16,000 and over	3.63	20,270			10.22	16,009									10.24	15,493
TOTAL	100.00%	$6,946	100.00%	$5,703	100.00%	$7,128	100.00%	$6,092	100.00%	$6,901			100.00%	$9,929	100.00%	$7,046

I.A. Ghazalah, Long Term Follow-Up of Vocational Education Graduates: A Study Based on Federal Income Tax Data, Ohio University and Ohio Department of Education, Division of Vocational and Career Education, 1987.

TABLE 14

OCCUPATIONAL WORK EXPERIENCE
REPORTED INCOME
(1983 TAX YEAR)

Size of Reported Income	All Regions Percent	All Regions Mean	Outside Ohio Percent	Outside Ohio Mean	All Ohio Percent	All Ohio Mean	Central Ohio Percent	Central Ohio Mean	Northeast Ohio Percent	Northeast Ohio Mean	Northwest Ohio Percent	Northwest Ohio Mean	Southeast Ohio Percent	Southeast Ohio Mean	Ohio-Other Percent	Ohio-Other Mean
Under $5,500	40.48%	$2,534	37.25%	$4,072	38.11%	$2,522			41.30%	$2,226	42.86%	$2,902	66.67%	$2,797	37.69%	$2,566
$5,500-$6,999	7.99	6,235														
$7,000-$8,499	8.82	7,892	35.29	7,244	21.51	7,200			23.91	6,622					22.11	7,363
$8,500-$9,999	8.82	9,435														
$10,000-$11,499	7.70	10,728					42.86	8,362								
$11,500-$12,999	7.42	12,296	17.65	10,918	23.40	10,818			21.74	10,728			33.33	11,126	23.62	10,873
$13,000-$14,999	5.04	13,819														
$14,500-$15,999	4.62	15,290									57.14	12,459				
$16,000 and over	9.11	21,018	9.81	17,645	16.98	18,492	57.14	18,723	13.05	19,062					16.58	18,543
TOTAL	100.00%	$8,108	100.00%	$7,731	100.00%	$8,181	100.00%	$14,283	100.00%	$7,321	100.00%	$8,364	100.00%	$5,573	100.00%	$8,238

I.A. Ghazalah, Long Term Follow-Up of Vocational Education Graduates: A Study Based on Federal Income Tax Data, Ohio University and Ohio Department of Education, Division of Vocational and Career Education, 1987.

$13,806), 4.04% between $14,500 and $15,999 (a mean of $15,350), and 10.04% had a reported income of at least $16,000 with a mean of $19,950.

The table also shows a distribution of reported income for those among the vocational graduates in 1979 who resided outside the state of Ohio in 1983, as compared to those who resided in the state (a mean reported income of $8,358 and $9,061 respectively). The reported incomes of the Ohio residents are then shown by the region of their residence (Central Ohio, Northeast Ohio, Northwest Ohio, Southwest Ohio, and Ohio-Other).

Table 15 shows 1983 reported income data by region for all 1979 graduates of all fourteen programs studied. These data indicate differences in the mean reported income among regions which range within Ohio from $10,358 in Northwest Ohio to $8,774 in Northeast Ohio. These differences are, of course, a function of both income differentials among regions for the same occupational skill as well as income differentials for graduates of the various vocational programs and the composition of vocational education graduates in each region.

A tabulation of mean reported income by program and region is given in Table 16, while Diagram 17 is a bar graph of mean reported incomes of all graduates of the fourteen vocational programs studied.

Table 18 presents disaggregated data on sources of 1983 reported income other than wages and salaries for all 1979

TABLE 15

ALL FOURTEEN VOCATIONAL EDUCATION PROGRAMS
MEAN REPORTED INCOME
(1983 TAX YEAR)

Size of Reported Income	ALL REGIONS Percent	ALL REGIONS Mean	OUTSIDE OHIO Percent	OUTSIDE OHIO Mean	ALL OHIO Percent	ALL OHIO Mean	Central Ohio Percent	Central Ohio Mean	Northeast Ohio Percent	Northeast Ohio Mean	Northwest Ohio Percent	Northwest Ohio Mean	Southwest Ohio Percent	Southwest Ohio Mean	Ohio-Other Percent	Ohio-Other Mean
Under $5,500	27.62%	$2,729	24.97%	$3,040	28.10%	$2,679	21.81%	$2,511	31.74%	$2,527	25.15%	$2,546	26.81%	$3,325	28.01%	$2,669
$5,500-$6,999	7.17	5,591	5.06	5,524	7.46	5,600	6.03	5,555	8.96	5,474	6.14	5,410	5.92	5,536	7.44	5,655
$7,000-$8,499	8.61	7,015	10.75	7,072	8.23	7,001	9.22	6,856	7.88	7,144	5.88	6,846	10.75	6,899	8.09	7,001
$8,500-$9,999	9.05	8,271	12.28	8,143	8.87	8,304	8.87	8,321	8.73	8,451	6.14	8,326	7.61	8,304	8.55	8,276
$10,000-$11,499	9.26	9,530	8.43	9.409	9.41	9,550	11.17	9,329	9.47	9,496	7.98	9,481	12.80	9,620	9.03	9,571
$11,500-$12,999	7.90	10,900	6.72	11,077	8.18	10,874	8.69	10,933	6.68	10,751	9.80	10,748	10.51	10,892	8.17	10,892
$13,000-$14,499	5.16	12,161	2.78	12,409	5.59	12,139	5.67	12,464	5.25	13,784	7.98	12,220	3.38	11,948	5.77	12,146
$14,500-$15,999	4.91	13,460	3.27	13,502	5.21	13,456	4.96	13,319	4.68	13,488	4.29	13,699	4.10	13,640	5.46	13,439
$16,000/over	20.26	19,930	25.24	22,477	19.35	19,335	23.58	19,380	16.61	19,323	26.69	19,115	18.12	18,540	19.49	19,323
TOTAL	100.00%	$9,583	100.00%	$10,823	100.00%	$9,361	100.00%	$10,182	100.00%	$8,774	100.00%	$10,358	100.00%	$9,291	100.00%	$9,396

I.A. Ghazalah, Long Term Follow-Up of Vocational Education Graduates: A Study Based on Federal Income Tax Data, Ohio University and Ohio Department of Education, Division of Vocational and Career Education, 1987.

TABLE 16

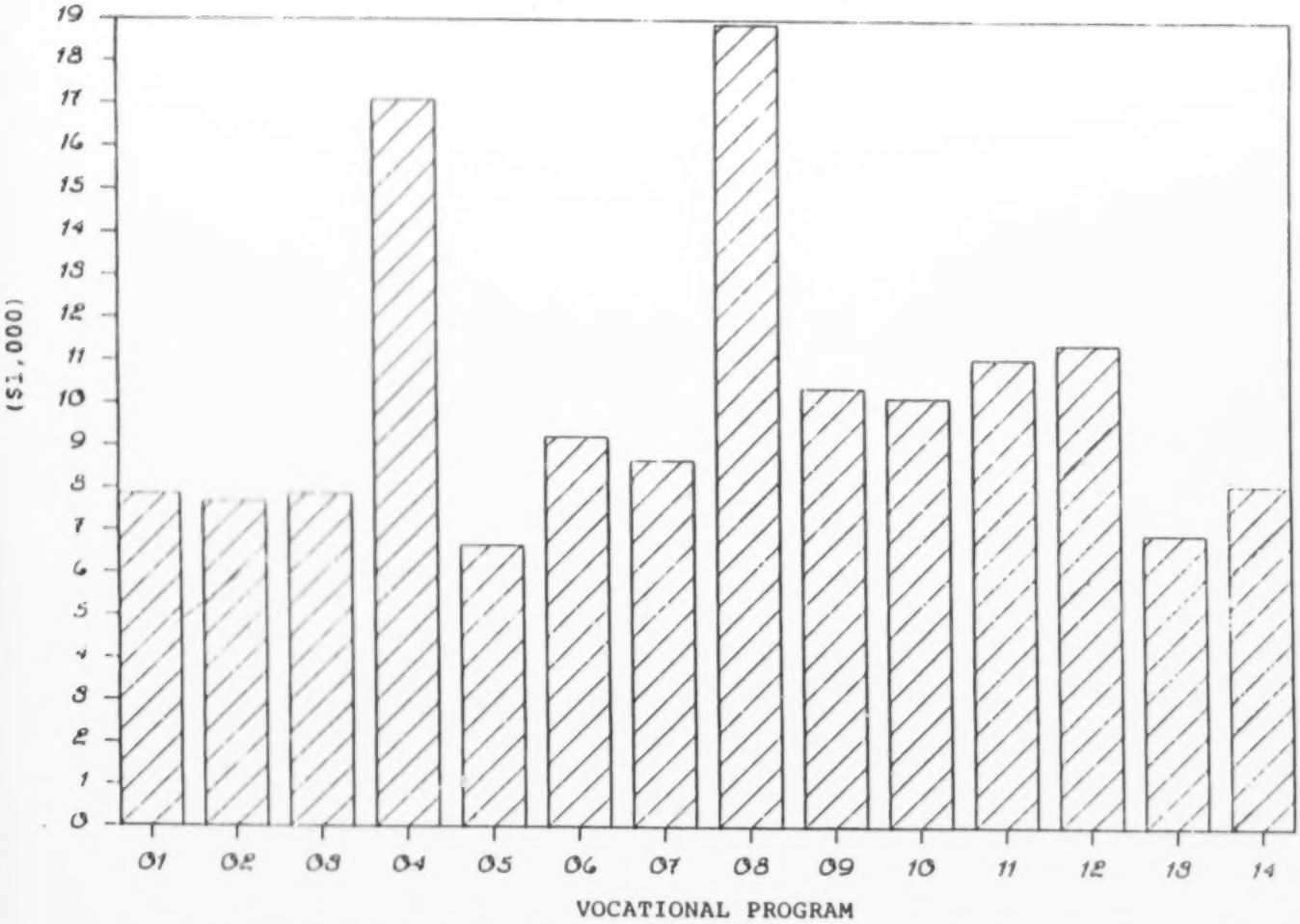
MEAN INCOME BY VOCATIONAL PROGRAM AND REGION
(1983 TAX YEAR)

VOCATIONAL PROGRAM	ALL REGIONS	OUTSIDE OHIO	ALL Ohio	Central Ohio	Northeast Ohio	Northwest Ohio	Southwest Ohio	Ohio-Other
Agricultural Production and Horticulture	$7,872	$9,483	$7,682	$8,390	$6,338	$9,248	$7,595	$7,878
Distributive Education	$7,697	$9,547	$7,338	$7,030	$7,574	$4,796	$9,196	$7,224
Health Occupations Education	$7,882	$8,800	$7,728	$6,683	$8,134	—	$9,855	$7,683
Health Occupations Education (Associate Degree)	$17,094	$17,799	$16,957	$15,363	$16,851	$18,514	$16,768	$16,956
Home Economics Education	$6,669	$7,983	$6,417	$6,167	$6,660	$8,713	$5,483	$6,384
Accounting, Computing, and Business Data Processing	$9,235	$8,358	$9,061	$11,272	$9,020	$8,358	$11,598	$9,078
General Office Clerical, Stenographic, Secretarial and Related Occupations	$8,674	$8,520	$8,696	$11,355	$6,822	$6,937	$9,071	$8,991
Technical Education (Associate Degree)	$18,889	$21,988	$17,893	$19,797	$16,741	$17,906	$17,447	$17,692
Auto Mechanics	$10,370	$9,844	$10,441	$9,157	$9,865	$12,030	$10,888	$10,489
Carpentry	$10,148	$13,378	$9,288	$11,367	—	$7,132	$9,794	$9,466
Electronics	$11,060	$11,252	$11,024	$9,774	$11,655	$8,502	$10,409	$11,194
Machine Shop	$11,396	$11,413	$11,393	$7,118	$11,530	$13,441	$12,598	$11,406
Cosmetology	$6,946	$5,703	$7,128	$6,092	$6,901	—	$9,929	$7,046
Occupational Work Experience	$8,108	$7,731	$8,181	$14,283	$7,321	$8,364	$5,573	$8,238

I.A. Ghazalah, Long Term Follow-Up of Vocational Education Graduates: A Study Based on Federal Income Tax Data, Ohio University and Ohio Department of Education, Division of Vocational and Career Education, 1987.

DIAGRAM 17

MEAN REPORTED INCOME BY VOCATIONAL PROGRAM



Vocational program numbers correspond to order of listing in Table 16.

I.A. Ghazalah, Long Term Follow-Up of Vocational Education Graduates: A Study Based on Federal Income Tax Data, Ohio University and Ohio Department of Education, Division of Vocational and Career Education, 1987.

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TABLE 18

SOURCES OF REPORTED INCOME
OTHER THAN WAGES AND SALARIES
(1983 TAX YEAR)
GRADUATES OF ALL FOURTEEN VOCATIONAL EDUCATION PROGRAMS

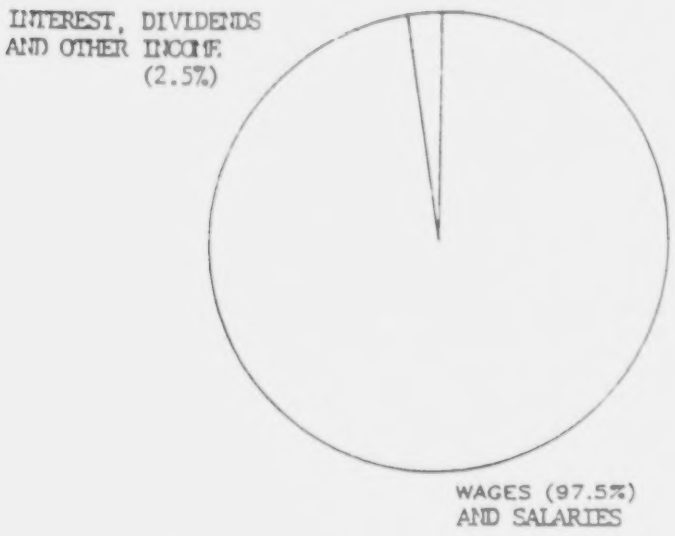
SIZE OF REPORTED INCOME	INTEREST INCOME		DIVIDENDS		OTHER INCOME	
	Percent	Mean	Percent	Mean	Percent	Mean
Under $5,500	19.69%	$227.05	2.51%	$468.98	2.99%	$3,238.70
$5,500-$6,999	22.98	148.22	1.21	273.90	1.65	2,206.54
$7,000-$8,499	28.05	116.49	1.91	220.22	1.85	2,627.34
$8,500-$9,999	29.61	140.38	2.70	267.18	1.53	2,860.98
$10,000-$11,499	36.06	143.03	3.30	475.83	0.74	3,917.30
$11,500-$12,999	39.66	158.28	2.94	337.53	2.03	3,053.55
$13,000-$14,999	39.56	195.36	3.77	251.29	0.78	2,316.45
$14,500-$15,999	43.15	192.98	4.39	247.78	2.12	1,646.25
$16,000 and over	53.45	242.64	9.70	209.21	2.69	1,814.86
TOTAL	31.63%	$190.16	3.68%	$305.79	2.16%	$2,764.45

I.A. Ghazalah, Long Term Follow-Up of Vocational Education Graduates: A Study Based on Federal Income Tax Data, Ohio University and Ohio Department of Education, Division of Vocational and Career Education, 1987.

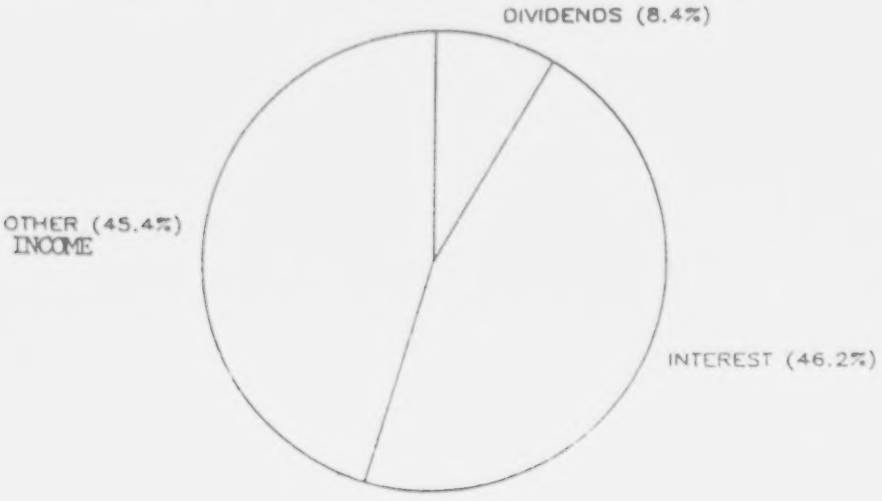
DIAGRAM 19

SOURCES OF REPORTED INCOME
(1983 Tax Year)
GRADUATES OF ALL FOURTEEN VOCATIONAL EDUCATION PROGRAMS

A. PERCENT OF TOTAL REPORTED INCOME



B. PERCENT OF REPORTED INCOME OTHER THAN WAGES AND SALARIES



I.A. Ghazalah, Long Term Follow-Up of Vocational Education Graduates: A Study Based on Federal Income Tax Data, Ohio University and Ohio Department of Education, Division of Vocational and Career Education, 1987.

vocational graduates included in the study. For each reported income bracket, the percentage of individuals in the income bracket who received the indicated income as well as the mean value of such income are shown. For example, for those with a reported income between $7,000 and $8,499, a total of 28.05% in the group received interest income with a mean of $116.49 per person, 1.91% received dividends with a mean of $220.22, while 1.85% received other income (miscellaneous income not as an employee) with a mean of $2,627.34 per person.

In Diagram 19, Panel A shows the division of total reported income between wages and salaries and the remaining sources of income, i.e., interest, dividends, and other income. Panel B shows the breakdown of income other than wages and salaries among the components of interest, dividends, and other income.

III

INCOME OF VOCATIONAL EDUCATION GRADUATES: COMPARISON WITH EQUIVALENT GROUPS

Income data on 1979 graduates of vocational programs for the 1983 Tax Year may be analyzed using baseline data on a comparable group, i.e. one with a comparable age bracket and educational achievement.

The U.S. Bureau of the Census data on 1983 Money Income of Persons in the United States[1] can be used as a baseline with appropriate adjustments for the U.S.-Ohio and Ohio regional income relatives. In 1983, earnings in the United States of males in the 18-24 age group with four years of high school education had a mean of $8,444. The equivalent figure for females was $6,228.

In order to carry out the comparison between earnings of graduates of vocational programs in our study sample and those of the comparable group in the general population we utilized the following procedure:

1. For each of the twelve secondary degree vocational programs, a U.S. basic comparison figure of earnings was calculated using the sex breakdown of graduates (See Table A) as weights. For example, the basic 1983 U.S. comparison figure of $7,190 for Distributive Education graduates was calculated by multiplying 0.434 (the proportion of males) times 8,444 (the male earnings figure) and adding

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[1]U.S. Department of Commerce, Bureau of the Census, Money Income of Households, Families, and Persons in the United States: 1983, Series P-60, 146.

the result to that of multiplying 0.566 (the proportion of females) times 6,228 (the female earnings figure).

For the two associate degree programs, Health Occupations Education (Associate Degree) and Technical Education (Associate Degree), the same procedure was followed using the applicable mean income of $18,424 for males and $11,497 for females. These are the 1983 U.S. mean earnings figures for those in the 25-34 age group with 1-3 years of college education.[2]

2. Bureau of the Census money income data for the applicable age group and years of schooling are nationwide data. Therefore, in order to provide an appropriate comparison of money incomes of vocational graduates to earners in the general population within the State of Ohio and within the five regions of the State, the money income data by program and region were adjusted using income relatives between the United States and Ohio, and between the United States and each of Ohio's five geographical regions. The income relative for each region was calculated using a population-weighted average of income relatives of component counties based on 1983 per capita income estimates for Ohio countries.[3]

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[2]The median age of the 1979 associate degree graduates in Ohio was 29 years in 1983. This estimate was based on the Ohio Board of Regent's 1979 Student Inventory Data, Enrollment in Ohio's Institutions of Higher Education: Two Years Centers, P-119.

[3]U.S. Department of Commerce, Bureau of the Census, East North Central 1984 Population and 1983 Per Capita Income Estimates for Counties and Incorporated Places, Series P-26, No. 84-ENC-SC.

Each 1983 mean reported income figure for vocational graduates included in the study (See Table 16) was then divided by the applicable income relative for the region (or the State as a whole) compared to the U.S.

3. Each of these adjusted reported income figures for vocational graduates was then divided by the 1983 mean money income applicable to the program as described in 1 above.

The results are shown in Table 20. The ratios of the 1983 mean incomes of the 1979 vocational graduates to the 1983 incomes of the comparable group (the same age bracket, educational achievement and geographic region) are listed by vocational program and region. The Auto Mechanics program can be used to illustrate the results. For all graduates of the Auto Mechanics program in our study, the mean 1983 income was 28% higher than the 1983 mean for the comparable group by age and educational achievement. For those graduates of the program who resided outside Ohio, the ratio of 1.22 indicates they received a mean income 22% higher than the 1983 mean for the comparable group by age and educational achievement. For all Auto Mechanics graduates who lived in Ohio, the mean income was 29% higher than the comparable group in Ohio. The remaining ratios of 1.13, 1.22, 1.49, 1.28 and 1.48 indicate a higher percentage mean income of 13, 22, 49, 28 and 48 for those who in 1983 resided in Central Ohio, Northeast Ohio, Northwest Ohio, Southwest Ohio, and Ohio-other respectively.

Table 21 provides data on mean reported income in 1983

TABLE 20

Ratios of Mean Income Of Vocational Education Graduates To Mean General Income By Vocational Program and Region

	ALL REGIONS	Outside Ohio	ALL Ohio	Central Ohio	Northeast Ohio	Northwest Ohio	Southwest Ohio	Ohio-Other
Agricultural Production and Horticulture	1.11	1.34	1.09	1.19	0.90	1.31	1.02	1.27
Distributive Education	1.12	1.38	1.06	1.02	1.10	0.69	1.27	1.19
Health Occupations Education	1.30	1.45	1.27	1.10	1.34	—	1.53	1.43
Health Occupations Education (Associate)	1.53	1.60	1.52	1.38	1.51	1.66	1.43	1.72
Home Economics Education	1.04	1.25	1.00	0.96	1.04	1.36	0.82	1.14
Accounting, Computing, and Business Data Processing	1.47	1.33	1.44	1.79	1.43	1.33	1.74	1.63
General Office Clerk, Stenographic, Secretarial, and Related Occupations	1.44	1.42	1.44	1.89	1.13	1.15	1.43	1.69
Technical Education (Associate)	1.16	1.35	1.10	1.22	1.03	1.10	1.02	1.24
Auto Mechanics	1.28	1.22	1.29	1.13	1.22	1.49	1.28	1.48
Carpentry	1.25	1.65	1.15	1.40	—	0.88	1.14	1.33
Electronics	1.37	1.40	1.37	1.21	1.45	1.06	1.22	1.58
Machine Shop	1.41	1.41	1.41	0.88	1.43	1.66	1.48	1.60
Cosmetology	1.16	0.95	1.19	1.01	1.15	—	1.56	1.32
Occupational Work Experience	1.08	1.03	1.09	1.90	0.98	1.12	0.71	1.25

I.A. Ghazalah, Long Term Follow-Up of Vocational Education Graduates: A Study Based on Federal Income Tax Data, Ohio University and Ohio Department of Education, Division of Vocational and Career Education, 1987.

TABLE 21

MEAN REPORTED INCOME
ALL VOCATIONAL PROGRAMS BY REGION AND PROGRAM LEVEL
(1983 Tax Year)

	Secondary Degree Programs*	Associate Degree Programs**
ALL REGIONS	$8,285	$17,983
OUTSIDE OHIO	8,639	20,409
ALL OHIO	8,227	17,346
Central Ohio	9,157	17,461
Northeast Ohio	7,810	16,633
Northwest Ohio	7,726	18,137
Southwest Ohio	8,747	17,181
Ohio-Other	8,240	17,251

*Agricultural Production and Horticulture; Distributive Education; Health Occupations Education; Home Economics Education; Accounting, Computing and Business Data Processing; General Office Clerical, Stenographer, Secretarial and Related Occupations; Auto Mechanics; Carpentry; Electronics; Machine Shop; Cosmetology; and Occupational Work Experience.

**Health Occupations Education (Associate Degree); and Technical Education (Associate Degree)

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TABLE 22

RATIO OF MEAN REPORTED INCOME TO MEAN INCOME
OF COMPARABLE GROUP BY REGION AND PROGRAM LEVEL
(1983 Tax Year)

	Secondary Degree Programs*	Associate Degree Programs**
ALL REGIONS	1.21	1.26
OUTSIDE OHIO	1.26	1.43
ALL OHIO	1.20	1.22
Central Ohio	1.33	1.23
Northeast Ohio	1.14	1.17
Northwest Ohio	1.12	1.27
Southwest Ohio	1.27	1.21
Ohio-Other	1.20	1.21

*Agricultural Production and Horticulture; Distributive Education; Health Occupations Education; Home Economics Education; Accounting, Computing and Business Data Processing; General Office Clerk, Stenographer, Secretarial and Related Occupations; Auto Mechanics; Carpentry; Electronics; Machine Shop; Cosmetology; and Occupational Work Experience

**Health Occupations Education (Associate Degree) and Technical Education (Associate Degree)

I.A. Ghazalah, Long Term Follow-Up of Vocational Education Graduates: A Study Based on Federal Income Tax Data, Ohio University and Ohio Department of Education, Division of Vocational and Career Education, 1987.

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for the 1979 graduates of secondary degree programs and for associate degree programs by region. Table 22 provides ratios of these reported mean incomes to the mean incomes of the comparable group, i.e. the same age bracket, educational achievement and geographic region.

IV

UNEMPLOYMENT RATES OF VOCATIONAL EDUCATION GRADUATES: COMPARISON WITH EQUIVALENT GROUPS

The 1983 data based on the Internal Revenue Service tax records provide some insight into the employment status of the 1979 graduates of vocational education programs included in the study.

Table 23 shows estimated unemployment rates in 1983 for the 1979 graduates of the various vocational programs studied.

The rates were obtained for each vocational program as follows:

1. In order to estimate the number of graduates of each program who were in the labor force, we multiplied the number of the 1979 graduates of each program by the labor force participation rate applicable to the group of graduates of the vocational program.

The U.S. Bureau of Labor Statistics estimates the 1983 labor force participation rates for those in the 16-24 age group in Ohio as .619 (61.9%) for females and .730 (73.0%) for males and for those in the 25-54 age group as .656 (65.6%) for females and .945 (94.5%) for males. The average labor force participation rate was calculated based on the applicable age group (secondary or associate degree programs) and the sex composition of each program.

2. The number of those 1979 graduates of each program who in 1983 did not receive wages and salaries nor "other income" (miscellaneous income, not as an employee) was divided

Table 23

UNEMPLOYMENT RATES OF VOCATIONAL EDUCATION GRADUATES AND EQUIVALENT GROUPS IN THE GENERAL POPULATION

Vocational Program	Estimated Unemployment Rate (Vocational Graduates)	General Unemployment Rate (Equivalent Group in General Population)	Relative Unemployment Rate (Vocational Program Graduates/General Population)
Agricultural Production and Horticulture	13.96%	22.92%	0.61
Distributive Education	13.96	22.78	0.61
Health Occupations Education	13.56	21.82	0.62
Health Occupations Education (Associate Degree)	5.54	10.10	0.55
Home Economics Education	19.23	22.10	0.87
Accounting and Computing, and Business Data Processing	12.03	22.62	0.53
General Office Clerical, Stenographic, Secretarial, And Related Occupations	12.84	21.75	0.59
Technical Education (Associate Degree)	6.18	11.06	0.56
Auto Mechanics	10.80	24.18	0.45
Carpentry	12.06	24.19	0.50
Electronics	7.98	24.13	0.33
Machine Shop	10.09	24.16	0.42
Cosmetology	17.75	21.73	0.81
Occupational Work Experience	17.48	23.48	0.74

I.A. Ghazalah, Long Term Follow-Up of Vocational Education Graduates: A Study Based on Federal Income Tax Data, Ohio University and Ohio Department of Education, Division of Vocational and Career Education, 1987.

by the total number of program graduates who were in the labor force calculated as described in 1. The figure so obtained represents the percentage of program graduates in the labor force for whom there were no reported wages and salaries or "other income", although they could have received interest income and/or dividends. The figures in the first column, Estimated Unemployment Rate, in Table 23 are the products of this operation.

3. Figures in the second column of Table 23, General Unemployment Rate, are the 1983 unemployment rates in the general Ohio population weighted by the sex composition of each program, using the 16-24 age group figure (24.2% unemployment rate for males, 21.7% for females) for secondary degree programs and the 25-44 age group figure (11.2% unemployment rate for males, 10.0% for females) for associate degree programs.

4. The last column lists for each program the ratio of the estimated unemployment rate of the program to the unemployment rate of the equivalent group in the general population. The relative unemployment rates range from 0.33 to 0.87 indicating that vocational graduates in our study sample experienced unemployment rates significantly lower than the equivalent group in the general population. For example, those who completed Accounting and Computing, and Business Data Processing had a relative unemployment rate of 0.53, i.e. their 1983 estimated unemployment rate of 12.03% represented 0.53 of the unemployment rate (22.62%) of the equivalent group

(age group and sex composition) in the general population. Graduates of Health Occupations Education who received associate degrees in 1979, experienced in 1983 an estimated unemployment rate of 5.54% which represents 0.55 of the unemployment rate of 10.10% for the equivalent group (age group and sex composition in the general population) in the same year.

V

INTER-REGIONAL MOBILITY OF VOCATIONAL EDUCATION GRADUATES

The purpose of this section is to analyze the mobility patterns of vocational education graduates by comparing their residence in 1983 to that of 1979.

Each vocational graduate was identified by the zip code of the school attended in 1979. Using the geographical regional classification of the state based on zip codes, we were able to determine for each vocational program the number of trainees who resided in each of the five regions of the State of Ohio (Central, Northeast, Northwest, Southwest, and other).

The group data on vocational graduates provided by the Internal Revenue Service for 1983 were classified by the same geographical regions within the state (as well as a sixth region: out of state) for each of the vocational programs. We were thus able to trace the net mobility of the vocational graduates between 1979 and 1983.

For each of the vocational programs a net retention rate was calculated in each of the regions by comparing the region's percentage share in the total number of trainees in 1983 to that in 1979. To illustrate the calculation of the net retention rate: if 15 percent of our sample of Auto Mechanics graduates were trained in Southwest Ohio in 1979 while 13% of the same group were identified as residents of Southwest Ohio in 1983, then the region's net retention rate

of graduates of the Auto Mechanics program is estimated to be 86.66% (13 divided by 15).

Table 24 provides the net retention rates by region for each of the fourteen programs studied as well as for all vocational programs combined. The retention rate of all programs for the state as a whole is estimated at 84.57, indicating that approximately 15.43% of the 1979 graduates were out-of-state residents in 1983. The state's retention rate was estimated to be in the mid to high 80's for the majority of the fourteen vocational programs. It should be pointed out that net retention rates are calculated using employee residence in 1983. Therefore, those whose work place was in Ohio but resided outside the state were not counted as retained by the state. If the measure of retention were to include those who worked and/or resided in the state, a higher retention rate would have been indicated.

A comparison of net retention rates for the five Ohio regions shows Northeast Ohio as experiencing the highest overall net retention rate at 95.34, i.e. in 1983 its share of residents among all 1979 vocational graduates was 95.34% of its share of graduates in 1979 - an estimate indicating a decrease of 4.66% in its share; while Central Ohio, Northwest Ohio, Southwest Ohio and the rest of Ohio (Ohio-Other) had 77.44%, 68.02%, 60.44% and 87.21% net retention rates indicating a decrease in their share of 22.56%, 31.98%, 39.56% and 12.79% respectively. In each case, the share decrease reflects the net outmigration of trainees to other regions in

TABLE 24

NET RETENTION RATES (1979-1983) OF VOCATIONAL EDUCATION GRADUATES BY REGION AND VOCATIONAL PROGRAM

	All Ohio	Central Ohio	Northeast Ohio	Northwest Ohio	Southwest Ohio	Ohio-Other
All Programs	84.57%	77.44%	95.34%	68.02%	60.44%	87.21%
Agricultural Production and Horticulture	90.08%	57.80%	92.13%	61.98%	52.96%	124.67%
Distributive Education	83.33%	72.60%	89.56%	85.83%	65.99%	71.75%
Health Occupations Education	85.29%	83.89%	96.13%	24.93%	61.69%	90.24%
Health Occupations Education (Associate Degree)	83.33%	—	94.33%	—	—	69.06%
Home Economics Education	84.41%	51.89%	89.35%	87.97%	52.50%	90.09%
Accounting, Computing, and Business Data Processing	88.54%	62.22%	102.27%	38.64%	40.84%	98.75%
General Office Clerical, Stenographic, Secretarial, and Related Occupations	85.95%	81.26%	101.06%	108.49%	72.33%	84.54%
Technical Education (Associate Degree)	75.63%	—	—	31.14%	323.9%	65.43%
Auto Mechanics	88.14%	61.04%	160.91%	38.34%	89.34%	87.55%
Carpentry	85.61%	69.76%	—	63.86%	63.03%	92.28%
Electronics	84.05%	62.96%	97.17%	55.59%	50.29%	94.13%
Machine Shop	88.39%	35.85%	82.62%	55.15%	72.33%	96.89%
Cosmetology	87.30%	51.25%	92.10%	28.57%	56.07%	97.61%
Occupational Work Experience	85.04%	44.28%	93.06%	84.86%	38.19%	88.68%

I.A. Ghazalah, Long Term Follow-Up of Vocational Education Graduates: A Study Based on Federal Income Tax Data, Ohio University and Ohio Department of Education, Division of Vocational and Career Education, 1987.

Ohio as well as to out-of-state locations.

Net retention rates reflect the forces of supply and demand for the various occupational skills generated by vocational programs. This phenomenon may be illustrated by comparing the net retention rates for the programs: Agricultural Production and Horticulture, and Health Occupations Education (Associate Degree).

For Agricultural Production and Horticulture, the state net retention rate of 90.08 is the highest among all vocational programs studied. Within the state, Ohio-Other (primarily the non-metropolitan areas of the state) shows a net retention rate of 124.67, the highest for any region and program, followed by Northeast Ohio with a net retention rate of 92.13. The substantially lower net retention rates, (57.80, 61.98 and 52.96), for the remaining regions reflect the relatively high excess supply of graduates of Agriculture Production and Horticulture in Central Ohio, Northwest Ohio, and Southwest Ohio.

The Program Health Occupations Education (Associate Degree) illustrates a slightly lower than average net retention rate for the state as a whole (83.33 compared to 84.57), a low net retention rate (69.06) for the Ohio-Other region (the primarily non-metropolitan areas of the State), but a high net retention rate for Northeast Ohio (94.33).

A comparison of net retention rates provides useful information about the matching of supply of and demand for graduates of the various vocational education programs among geographical regions.

VI

CONCLUSIONS AND RECOMMENDATIONS

Vocational Education, as all forms of education, has a multi-dimensional effect on the welfare of individuals and society. Determination of the economic performance of graduates of vocational programs is essential to the process of decision making over the allocation of a given set of scarce resources among numerous competing uses.

In its measurement of the economic performance of graduates of vocational programs, this study uses an original source of information-federal income tax records. The federal income tax source avoids a number of limitations associated with follow-up studies utilizing questionnaires. The tax records data are standardized by type of income and by period (tax year), and do not rely on the memory nor the selectivity of individual responses to questionnaires. The data were provided in batch form by the Internal Revenue Service from its Information Returns Processing File in full compliance with the strict requirements regarding disclosure of personal information.

A random sample of 15,055 graduates in 1979 of fourteen vocational programs in Ohio is used in the study. The reported income in Tax Year 1983 is obtained for graduates of each of the vocational programs. The data are categorized by the area of residence in 1983-any of five regions in Ohio (Central, Northeastern, Northwestern, Southwestern, and Other) and outside Ohio. The income of completers of vocational

programs four years following their graduation are compared to income of equivalent groups in the general population (same age group, years of schooling and region of residence). The results indicate predominatly higher incomes for vocational graduates.

The employment status of vocational graduates is also analyzed in the study. The 1983 estimated unemployment rate for graduates of each vocational program is compared to the unemployment rate of the equivalent group in the general population. The unemployment rates are lower for graduates of all vocational programs.

The study also investigates the geographic mobility of vocational graduates between 1979, their year of graduation, and 1983. The net retention rates for all vocational programs combined and for each of the vocational programs provide useful data for the state as a whole as well as for individual regions within the state.

The data and analyses of the data presented in this monograph show the value of utilizing federal tax records as a source of information on the performance of graduates of vocational education programs. The rewards from obtaining reliable and consistent federal tax data point to the potential in terms of expansion of data items retrieved as well as the pursuit of information on the performance of vocational graduates over an extended period of time.

The sources of income: wages and salaries, self-employment, interest, and dividends as well as information on

homeownership, ownership of financial assets, family size, and occupation would contribute to our understanding of the impact of vocational education. Longitudinal studies of groups of vocational graduates would provide information on the nature and level of the impact of vocational education and the change over time in this impact. Knowledge of the performance over time of vocational graduates as a whole as well as graduates of specific programs would be useful to effective decisionmaking.